Waste Facts

A COMPANION DOCUMENT
FOR TOO GOOD TO WASTE:
MAKING CONSERVATION A PRIORITY

Alberta

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Introduction

This Waste Facts document contains facts and figures on waste generation, waste diversion, recovery, and management practices from various sectors of Alberta's society. It should be used in conjunction with Alberta's Waste Strategy entitled ***Too Good to Waste: Making Conservation a Priority***.

12,893

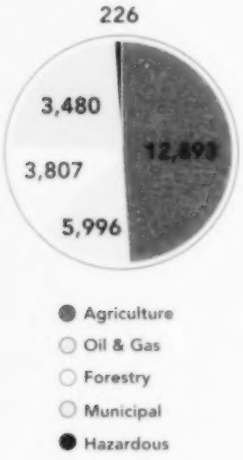
Waste Generation Sectors

Alberta's waste management system has been divided into five "sectors" based on the type of residual materials being managed or the economic sector generating the materials (municipal, hazardous, oil & gas, agriculture, and forestry).

The relative production of residual materials is presented in Figure 1.

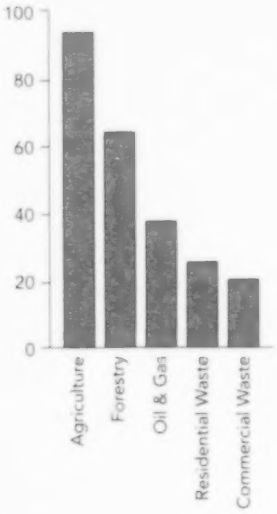
The diversion percentage of these materials is presented in Figure 2.

Figure 1
Production by Sector
('000 tonnes)



(Sources for Figure 1 and 2 include Statistics Canada, Energy and Utilities Board, Alberta Forest Products Assoc., Alberta Agriculture, Alberta Environment)

Figure 2
Recovery Rates by Sector
(per cent)



(Note: Municipal solid waste is further broken into residential and non-residential waste. Non-residential waste includes waste from the industrial, commercial, and institutional sector, and the construction, renovation and demolition sector.)

Waste Management Facilities

Alberta's waste management infrastructure consists primarily of facilities for collection of recyclables (approximately 4,000), waste disposal, and waste handling. An extensive network of collection facilities for used oil, beverage containers, scrap tires, waste electronics, etc., allows for convenient drop-off and collection. The processing of recyclables is accomplished through a limited number of composting and recycling operations. Energy recovery facilities are also currently limited in Alberta. The capacity of waste disposal facilities is currently much more extensive than the infrastructure capacity for materials recovery.

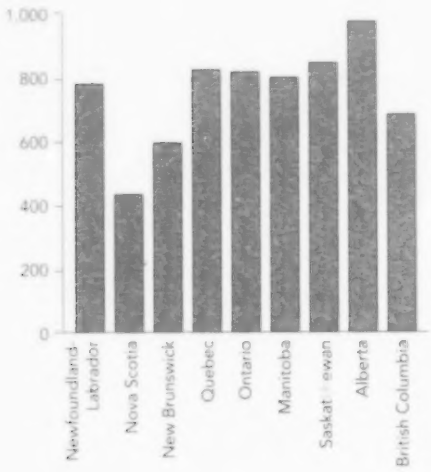
LAND APPLICATION

A significant volume of materials (an estimated 1,000,000 dry tonnes annually not including agricultural manure applications) is applied directly to land every year. This includes applications of drilling waste, compost, wood ash, hydrocarbons, bio-solids from sewage treatment plants and pulp sludge.

Municipal Waste Generation

Statistics Canada separates MSW into two categories: residential and non-residential waste. Figure 3 shows Alberta leads the country in the per capita disposal of Municipal Solid Waste (MSW) at 968 kg/person.

Figure 3
Waste Disposal – 2004
(kg/capita)



(Source: Statistics Canada)

Did you know?

> One tonne of municipal garbage takes up 1.5 - 2.5 cubic metres of space in a landfill.

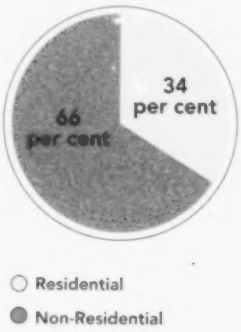
> Studies show that 25 per cent of municipal waste can be diverted away from landfills through changes in consumer behaviour.
(Source: Waste Not, March 2004)

> During the first 15 years of burial in a landfill, only 25 per cent of organic material such as food and yard waste decomposes. Other trash can keep its original weight, volume, and form for at least 40 years.
(Source: Waste Not, March 2004)

> Organic materials that decompose in landfills can produce methane gas. Often called landfill gas, methane is 21 times more potent than $C0_2$ as a greenhouse gas. The best place for organic materials is in a composting facility, a bio-digester or an energy extraction facility
(Source: Environment Canada – Greenhouse Gas Inventory 1990-2000).

Figure 4 shows the per cent of MSW each category is responsible for generating.

Figure 4
MSW by Category – 2004
(per cent)



(Source: Statistics Canada)

Residential includes (non-hazardous) solid waste produced by residences that is picked up by the municipality (either using its own staff or through contracting firms) or self-hauled to depots, transfer stations and disposal facilities.

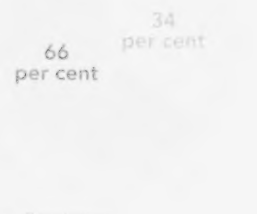
Non-Residential includes construction, renovation and demolition waste and industrial, commercial and institutional waste.

Construction, Renovation and Demolition includes (non-hazardous) waste generated by construction, renovations, and demolition activities and includes material such as: concrete, brick, painted and treated wood, rubble, drywall, metal, cardboard, doors, windows, and wiring, but excludes clean sand or gravel.

Industrial, Commercial, and Institutional includes (non-hazardous) solid waste generated by all IC&I sources in a municipality. These include:

- **industrial materials,** which are generated by manufacturing, and secondary industries, and managed off-site from the manufacturing operation. Mining, agriculture, and forestry wastes (primary industry wastes), contaminated soil and oilfield wastes are not included in the Statistics Canada data;
- **commercial materials**, which are generated by commercial operations such as shopping centres, restaurants, offices, etc.; and
- **institutional materials**, which are generated by institutional facilities such as schools, hospitals, government facilities, senior's homes, universities, etc.

Figure 4
MSW by Category – 2004
(per cent)



WASTE COMPOSITION

(Source: Opportunities for Accelerated Solid Waste Reduction in Alberta – Part 1 Working Document, Oct. 1997)

- 31 per cent of (MSW) is organic (table scraps, leaf and yard waste, disposable diapers and sanitary products, pet feces, screenings from sewage treatment plants, etc.)
- 34 per cent of (MSW) is paper.

WASTE MANAGEMENT COSTS

There are significant costs associated with the disposal of waste. Table 1 indicates a 79 per cent increase in costs (1996 - 2004) associated with waste management expenditures for Alberta municipalities.

Table 1

Year	Municipal Waste Expenditures
1996	$ 101,272,000
1998	$ 105,586,000
2000	$ 148,594,000
2002	$ 152,387,000
2004	$ 181,367,000

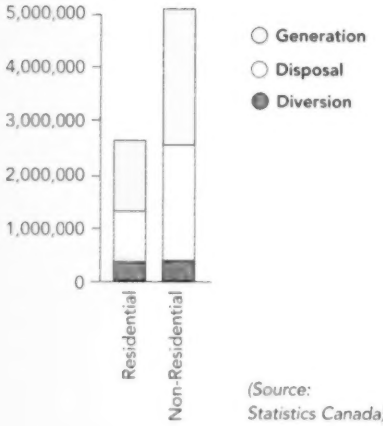
(Source: Statistics Canada)

Non-hazardous Solid Waste Diversion/Recycling

Did you know?

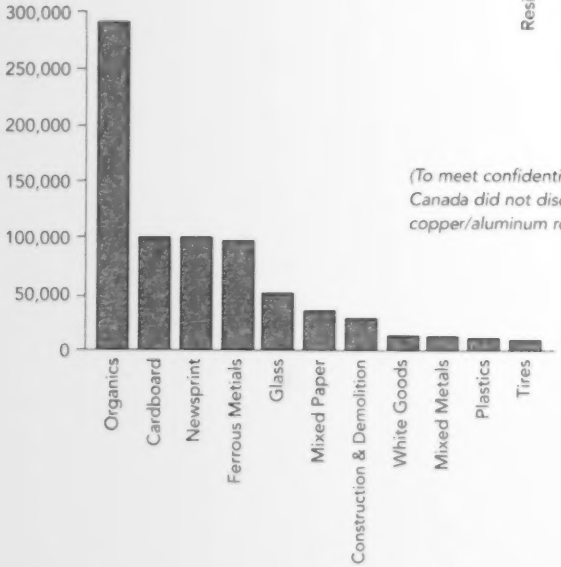
> In 2007, the Recycling Council of Alberta (RCA) took over the toll-free Alberta Recycle Information Line **1-800-463-6326 or (780) 427-6982**. RCA offers information on recycling and waste minimization topics to municipalities, businesses, and the general public.

Figure 5
Alberta Waste – 2004 (tonnes)



(Source: Statistics Canada)

Figure 6
Materials Prepared for Recycling by Type – 2004 (tonnes)



(To meet confidentiality requirements, Statistics Canada did not disclose electronics or copper/aluminum recycling figures for Alberta.)

COMPOSTING

At least 600,000 tonnes of yard and garden waste, lawn clippings and kitchen scraps could be diverted from landfills each year. The Edmonton Composting Facility is the largest of its type in the world, representing 35 per cent of Canada's centralized composting capacity. In 2002, this facility processed 167,000 tonnes of MSW and produced 70,000 tonnes of compost.

Did you know?

> Composting is nature's recycling system: it keeps organic material out of the waste stream and provides a natural fertilizer for gardens.

> An average family of four can compost over 500 kilograms of food and yard waste in a year. *(Source: Waste Not, March 2004)*

> If Albertans diverted household food scraps from the landfill to composting, there would be a net CO_2 emissions savings of 237,690 tonnes per year. Diverting to an anaerobic digester would result in a net CO_2 emissions savings of 213,500 tonnes per year. Assumption: Each Alberta household produces three kg of food scraps/week.

BEVERAGE CONTAINERS

- 57,000 tonnes of recycled products are produced annually from beverage containers. Products include: new aluminium cans, plastic lumber, fiberglass insulation, napkins and specialty paper.
- In 2006, there were more than 1.9 billion beverage containers (excluding milk) sold in Alberta.
- In 2006, Alberta collected and recycled 1.5 billion beverage containers. This equates to:
  - 441 empty containers per Albertan
  - 384,000 metric tonnes of containers being diverted from landfills
  - an average return rate of 74 per cent
- 722,706,865 aluminium cans were diverted from Alberta landfills in 2006.
- More than 200 independently owned bottle depots operate in the province.

(Source: CO_2 emissions: "Determination of the Impact of Waste Management Activities on GHG Emissions: 2005 Update" Natural Resources Canada and Environment Canada)

Did you know?

> 95 per cent less energy is required to produce a new aluminium can from recycled material than from raw material.
> In 2006, Albertans saved the equivalent of over 433,000 barrels of crude oil by recycling their beverage containers.
> Albertans fail to redeem more than $18 million worth of empty container deposits by not recycling each year.

USED OIL MATERIALS

Did you know?

> 84 million litres of used oil was collected and recycled in 2006 – 80.1 per cent returned
> 7 million oil filters were collected and recycled in 2006 – 89 per cent returned
> 1.7 million kg of used oil containers were collected and recycled in 2006 – 61.3 per cent returned
> Recycling used oil is estimated to conserve more than 189,000 barrels of crude oil per year.

What Happens to Used Oil Materials?

In 2005

- 4 per cent was used as heating oil in small space heaters
- 22 per cent was re-refined into lubricating base oil
- 23 per cent was reprocessed into other petroleum products
- 51 per cent was used as heating oil by industrial and asphalt plants
- 24 per cent of used containers were used to make new containers
- 76 per cent of used containers were reprocessed into durable goods (e.g. guardrail posts, curbs, plastic pipe, etc.)
- All filters collected were processed at steel recycling mills for use in new metal products (e.g. rebar, nails, wire).

SCRAP TIRES

- Over 4,500,000 tires are discarded by Albertans per year and recycled.
- 40,000,000 tires have been recycled since 1992

What Happens to Scrap Tires?

- More than 80 per cent of the recycled rubber material is used right here in Alberta.
- Recycled scrap tire products manufactured in Alberta include "loose crumb" for safer-than-sand playgrounds, loose crumb filled "mattresses" for the dairy industry, moulded products such as patio "pavers", floor tiles and residential roofing shingles.
- Tire shred is used as drainage material in civil engineering applications.
- Research into the use of recycled rubber as an additive to asphalt has been undertaken since 2002. Promising results include: noise reduction, traction, and reduced cracking
- The Alberta Research Council is looking at the feasibility of reclaiming rubber from scrap tires as a substitute for virgin rubber polymer materials.

SCRAP ELECTRONICS

12,000 tonnes of waste electronics were collected between October 2004 and March 2007.

- 230,000 monitors
- 195,000 computers
- 110,000 printers
- 100,000 televisions

What Happens to Scrap Electronics?

- The steel from computers goes to steel foundries
- The cathode ray tubes go to a lead smelter
- The non-ferrous metals (e.g. aluminum) go to metal recyclers
- The plastic goes to plastic recyclers or to energy recovery

ROLE OF DELEGATED ADMINISTRATIVE ORGANIZATIONS IN MUNICIPAL WASTE REDUCTION

Three Delegated Administrative Organizations, operating at arms length from government, report to the Environment Minister. Each one is supported by government regulation, has the authority to generate revenue, has a dedicated fund to operate its program, and is managed by a Board of Directors.

Beverage Container Management Board (BCMB)

The (BCMB) is a partnership of beverage manufacturers, depot operators, environmental organizations, municipalities, the public, and the Alberta Government. The Board works to ensure Albertans have an easy-to-use and cost-effective recycling system for beverage containers. The program began as a response to the litter created by disposable beverage containers. Consumers pay a deposit when purchasing applicable containers and are refunded that deposit upon taking the containers to a bottle depot.

Contact Information:
Phone: 1-888-424-7671
Email: info@bcmb.ab.ca
www.bcmb.ab.ca

Alberta Used Oil Management Association (AUOMA)

The Alberta Used Oil Management Association (AUOMA) is a not-for-profit organization. Membership is a requirement for all first sellers of oil materials in Alberta. The association is comprised of representatives from manufacturing, retailing, consumers, urban and rural municipalities, the Province of Alberta and other non government organizations.

Formed in 1993, AUOMA was established to manage the millions of litres of used oil, oil filters and plastic oil containers that were being improperly disposed of in Alberta. Each applicable oil product is assessed an Environmental Handling Charge that is paid at the wholesale level. Collected funds are dedicated to the collection and processing of used oil material and administrative costs. A return incentive is paid to registered collectors for pick-up and delivery of materials.

Contact Information:
Phone: 1-888-922-2298
Email: reception@usedoilrecycling.com
www.usedoilrecycling.com

Alberta Recycling Management Authority (Alberta Recycling)

The Alberta Recycling Management Authority (Alberta Recycling) is a not-for-profit association managed by a Board of Directors representing many different stakeholders. Originally established in 1992 to administer the province's tire recycling program, Alberta Recycling has evolved and now also manages the waste electronics recycling program, which began in 2004 and was the first of its kind in Canada, as well as the recently-announced paint recycling program. All programs are funded by environmental fees collected on the sale of eligible products sold in Alberta. Through the programs' successes, Alberta Recycling demonstrates the benefits of multi-material administration by applying consistent policies and procedures for environmental stewardship, and achieving improved program efficiencies.

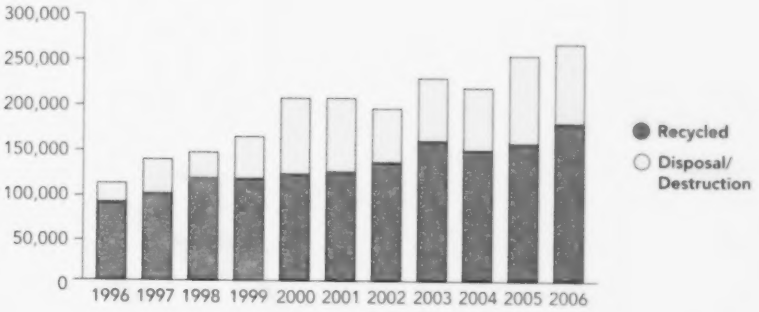
Contact Information:
Phone: 1-888-999-8762
Email: mail@albertarecycling.ca
www.albertarecycling.ca

Hazardous Waste Generation

Hazardous waste is comprised of materials that are toxic, flammable, reactive or corrosive and includes a wide variety of wastes such as: contaminated soil, solvents, pesticides, PCBs, used oil and industrial sludges.

- Over 200,000 tonnes of hazardous waste/recyclables are generated in Alberta annually.
- Most of the hazardous waste in Alberta is contaminated soil – this material is sent to either of Alberta's two commercial hazardous waste landfills.
- The Swan Hills Treatment Centre destroys persistent organic wastes through high-temperature incineration. Since 1987, this facility has destroyed more than 285,000 tonnes of hazardous waste. Alberta's entire inventory of PCBs has been virtually eliminated.
- Over two thirds of hazardous waste is recycled.

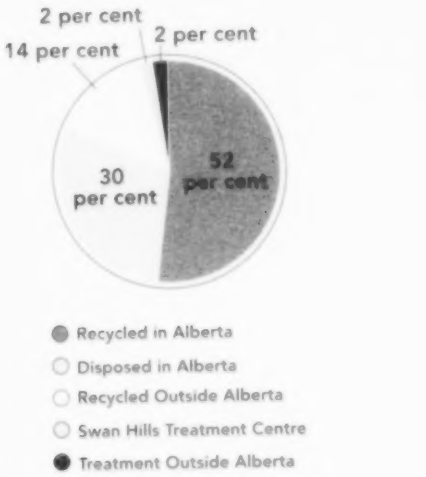
Figure 7
Hazardous Waste Generation and Recovery in Alberta – 1996 to 2006 (tonnes)



(Source: Alberta Environment)

52
per cent

Figure 8
Hazardous Waste Dispositions – 2006 (per cent)



(Information regarding the disposition of hazardous recyclables is not currently available.)

HOUSEHOLD HAZARDOUS WASTE

- Household Hazardous Waste (HHW) (generated by households) is exempt from hazardous waste tracking and management provisions when disposed of by householders. The voluntary HHW roundup program helps to divert this waste stream from municipal landfills.
- The HHW program treats and disposes of more than one million litres of material per year.
- Over 10 million litres of HHW have been safely treated and disposed of in Alberta since 1988.
- Paint makes up approximately 70 to 75 per cent of the HHW material collected. A program specifically for paint is being implemented.

OBSOLETE PESTICIDES

- The pesticide manufacturing industry (CropLife Canada) has supported obsolete pesticide collections across Canada as a product stewardship initiative.
- 184,000 kilograms of obsolete pesticides were collected from Alberta farmsteads over three separate collections in 2002, 2003, and 2004.
- Funding was provided by CropLife Canada, Agriculture and Agri-Food Canada, through the Agriculture & Food Council of Alberta. A number of other agencies supported the program.
- Over 50 per cent of products collected were older than 10 years.
- Over 99.9 per cent of pesticides purchased by Alberta farmers are used as intended.

COMMERCIAL PESTICIDE CONTAINERS

- The pesticide manufacturing industry (CropLife Canada) manages pesticide container collection and recycling from approximately 100 collection sites across Alberta.
- Municipal governments manage container collection sites.
- 1.4 million containers are collected annually.
- Over 20,000,000 containers have been collected in Alberta since program began in 1980.
- The Alberta collection program has been operating as part of a national collection system since 1989 – 55,000,000 containers have been collected nationally since 1989.
- 75 per cent of Canadian plastic is recycled into fence posts.
- 25 per cent of Canadian plastic is used as a natural gas substitute in the processing of concrete aggregate.

CONTAMINATED SOIL

- By weight, contaminated soil is Alberta's single largest hazardous waste stream. A number of private landfills operate specifically to receive contaminated soil.
- It is estimated that at least 3,000,000 tonnes of contaminated soil is landfilled in Alberta annually (accurate information regarding contaminated soil disposal is currently limited).
- Contaminated soil results primarily from oil and gas development, petroleum storage (underground storage tanks), industrial development, and accidental spills. Much of the soil contamination in Alberta is a "legacy" from times when environmental protection standards were less stringent. As former industrial or commericial areas (e.g. gas stations) come under re-development, contaminated soil needs to be remediated or removed.

Oil & Gas Waste Generation

The Energy and Utilities Board requires the generators of oilfield wastes to track all dangerous oilfield waste and reportable oilfield wastes from the point of generation to the final point of disposition (cradle to grave). The Annual Oilfield Waste Disposition Reports identify the largest quantities of reported oilfield wastes to be contaminated soil, produced sand, sludges, and well work over fluids. The most common dispositions for oilfield wastes are landfilling, treatment at an oilfield waste management facility, biodegradation (one-time, on-site), and deep well disposal.

Forestry Waste Generation

The Alberta Forest Products Association works with its member companies to reduce waste, or to enhance value from residual products that have a market value or alternative use. In 1998, a detailed survey examined the types of wood residuals generated by Alberta forest product companies and their end uses. Energy recovery (boiler fuel, heat for drying, etc) accounts for approximately 80 per cent of wood residual use (approximately 2,000,000 tonnes).

46
per cent

Agricultural Waste Generation

Alberta has some of the largest confined feedlot operations and meat packing plants in Canada. Agricultural production and processing produces high volumes of organic residuals including manure, straw and livestock processing waste.

MANURE

Where manure production is surplus to land nutrient needs, it's possible to use the excess to generate energy and other products such as compost or fertilizers. Manure can be classified according to source. Based on data from Statistics Canada (2004) and Agriculture and Food, the largest sources of manure are:

1. 2,900,000 beef cattle in feedlots
2. 2,775,000 cow/calf units on farms
3. 190,000 dairy cows.
4. 2,050,000 hogs
5. 3,172,221 poultry

STRAW

Most manure and straw residues are returned to land. The province usually has an excess of straw during normal years. This excess is normally found in the Black Soil Zone. This soil zone runs from High River through to Camrose and Westlock and east between Wainwright and St. Paul over to the Saskatchewan border.

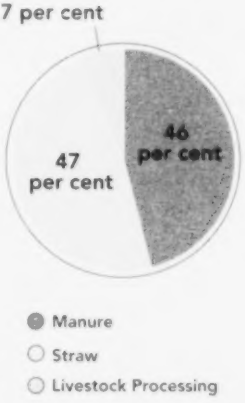
LIVESTOCK PROCESSING

The province also has some of the largest meat rendering facilities in Canada. This includes both beef and hog processing. In 2004 Alberta processed:

- 2,600,000 beef animals
- 3,008,995 hogs

Figure 9 identifies current volume in tonnes, of agriculture's straw, manure, and livestock processing feedstock's (as a per cent).

Figure 9
Agricultural Residuals (per cent)



Alberta Waste Management Milestones

1971

A requirement under the Refuse Disposal System regulations was "any person or municipality wishing to operate a refuse disposal site (must acquire) a permit from the Provincial Board of Health".

1972

The Beverage Container Recycling Program is first established. This program includes deposit refund system for select beverage containers. As of 2006, this program manages the recycling of all ready-to-serve non-milk beverage containers sold in the province (e.g., pop, juice, water, and soy beverage containers).

1975

Under the Waste Management Assistance Program, municipalities received financial assistance to manage solid wastes. By 2004 over 350 dumps were closed and more than 40 regional landfills developed through the program.

1976

The Resource Recovery Grant Program (provided) assistance to municipalities to develop recycling and waste minimization projects. The grant program covered 75 per cent of costs while the applicants covered the other 25 per cent.

The Alberta Government builds a regional sanitary landfill northwest of Pincher Creek for $500,000 to demonstrate and promote regional landfills. The project helped eliminate open dumps and associated problems in the eight participating communities in the Crowsnest Pass/Pincher Creek area.

1980

Alberta establishes a pesticide container collection program for the province. Farmers and commercial applicators left empty containers at collection sites. Municipal governments, transfer station and landfill operators then transferred the containers to permanent sites where they were processed.

1982

The *Special Waste Management Corporation Act* allowed a crown corporation to ensure the establishment, operation, and maintenance of facilities to deal adequately with hazardous wastes.

The citizens of Swan Hills, Alberta voted 79 per cent in favour of having a hazardous waste treatment centre located near their town.

1985

The *Alberta Hazardous Chemicals Act* was the first legislation passed in Canada to control hazardous waste.

1988

The Household Hazardous Waste program was launched. Communities' hosted "roundups" in which they collected wastes from households, primarily paint. By 2004, 114 communities participated in the program and over nine million litres of household hazardous waste was collected and properly recycled/treated and disposed.

1990

A ten-year voluntary program calls for members of the National Packaging Protocol (NaPP) to cut their amount of packaging disposal in half by 2000.

1991

The Action on Waste Program was launched to:

- oversee regulated and voluntary recycling programs
- represent Alberta Environment on boards and committees
- expand waste reduction programs
- create and distribute educational materials
- operate the toll-free Recycling Information Line.

1992

The *Environmental Protection and Enhancement Act* (EPEA) passes June 26, 1992, and came into force September 1, 1993. Nine acts were consolidated to form EPEA: the *Agricultural Chemicals Act, The Beverage Container Act, the Clean Air Act, the Clean Water Act, the Ground Water Development Act, the Hazardous Chemicals Act, the Land Surface Conservation and Reclamation Act, the Litter Act,* and *sections of the Department of the Environment Act.*

The Tire Recycling Program is regulated. The program provides incentives to businesses that collect and recycle tires.

1993

The Waste Control Regulation addressed the control of waste (litter); the identification, handling, storage, and disposal of hazardous waste; and the treatment, storage, and recycling of hazardous recyclables.

1996

The Waste Control Regulation is updated. Standards for landfills and compost facilities are added. Responsibility for landfills is transferred from Alberta Health, to Alberta Environment.

The Energy and Utilities Board's Guide 50 provided an overview of on and off site disposal methods; information, notification, and approval requirements; sampling methods, and toxicity assessment for oilfield waste.

1997

The Used Lubricating Oil Recovery Program is regulated. The public was able to drop off used oil, oil filters, and containers at designated collection facilities for recycling.

Recycling of Tetra Paks is introduced to the Beverage Container recycling program.

1999

Recycling of plastic milk jugs is introduced. These jugs are made of high-density polyethylene and are a valuable recycling material.

2000

The Energy and Utilities Board (EUB) and Alberta Environment clarified the division of regulatory responsibilities for oilfield waste based on the type of waste management facility or activity.

The Government of Alberta took over ownership of the Swan Hills Treatment Centre and established a contact operator to continue treatment of hazardous waste.

Consultations on hazardous waste management are held to update hazardous waste management systems.

2001

Alberta Environment adopts a goal to reduce Municipal Solid Waste disposal to 500 kg/capita by 2010.

The first phase of the "Partners in Recycling Program", a voluntary program to encourage the recycling of spent fluorescent light tubes and computers, is launched. Phase I focused on encouraging recycling of these materials in the MUSH sector (Municipalities, Universities, Schools, and Hospitals). The program did not achieve its goal of a 75 per cent recycling rate by 2002. Only 25 per cent of computers and 107,000 meters of fluorescent bulbs were recycled.

The Municipal Waste Management Operator Certification Program was implemented as a result of the Waste Control Regulation which stated, "...(Class II or III landfills or Class I or II compost facilities) shall be supervised by a specified number of certified operators..."

Recycling of beer containers is introduced to the Beverage Container recycling program.

2002

The *Agricultural Operation Practices Act* provides regulations for spreading manure or compost (or composting materials) for all livestock operations in Alberta.

The second phase of the "Partners in Recycling Program" (a voluntary program to recycle spent fluorescent light tubes (FLT) and computers) was launched. Phase II focused on encouraging recycling within the industrial, commercial, and institutional (ICI) sector. By 2004, only 40 ICI partners voluntarily joined the program. The voluntary program for computers ended in 2004 with the introduction of a regulated electronics recycling program. As of 2006, the voluntary program for FLTs is still in operation.

2003

Report on hazardous waste management identifies the need to resolve several outstanding issues including hazardous waste treatment.

2004

Alberta Environment releases its Municipal Waste Action Plan 2004-2006. The Action Plan highlights key activities and approaches, to target and achieve improved recycling of key waste materials. The plan also identifies several outstanding issues.

The Electronics Recycling Program is regulated. It becomes the first provincial electronic recycling program in Canada. Consumers purchasing electronic equipment included in the program (currently televisions and computer equipment) are required to pay a $5 - $45 fee upon purchase to finance the program. The fees fund recycling, education/awareness programs and related research.

2004-2007

Alberta Environment develops a waste strategy to resolve outstanding issues and consolidate approaches to waste management across municipal and industrial sectors. A Waste Strategy report entitled *Too Good to Waste: Making Conservation a Priority* is released. A companion document entitled *Waste Facts* accompanies the release.

Alberta Environment announced a paint stewardship program, aimed at safe recycling or disposal alternatives for household paint products.

For more information, or to order additional copies, contact:

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Toll-free: Dial 310-0000
and the phone number
Telephone: (780) 427-2700
www.environment.alberta.ca

ISBN No. 978-0-7785-6776-9

printed on recycled paper